

July 5, 1973.

Professor J. Lederberg, Ph.D.  
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Stanford Univ. Medical Center  
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Dear Professor Lederberg,

Thank you for sending preprints of your work on  $\text{CaCl}_2$ -mediated transfection of *S. typhimurium* by P22 Phage DNA. Several of my colleagues are very interested in this matter.

After returning to Freiburg, one of our coworkers succeeded in producing two types of Hybrids: (a) A normal *E. coli* strain (non-pathogenic) with the outfit of *S. typhimurium* O antigenic specificity - (b) a pathogenic *S. typhimurium* strain with the outfit of *E. coli* O-antigenic specificity. While the *E. coli* with *Salmonella* O specificity protected mice very well against *S. typhimurium* infection (after ~~xxxx~~ oral immunization with the living strain), the pathogenic, but *E. coli*-specific *S. typhimurium* strain did not. From these data it seems that the O-specific determinants are really of crucial importance for immunity against *S. typhimurium* in mice. The strains hitherto isolated appear to be so-called SR-strains, because during hybridization only the locus responsible for the biosynthesis of the repeating (oligosaccharide) units is being transferred, while the locus for the polymerase (condensing the repeating oligosaccharides to longer chains) is not transferred at the same time. We are, of course, trying to transfer this locus in an independent experiment.

As to the structure and Biosynthesis of R-forms I may refer to one of our recent reviews in "Microbial Toxins" (Academic Press, Inc. 1971), Vol. 4, chapter 4 (pg. 145-233) of which no reprints are available, I am sorry. - In case any of your people would be interested in such strains (as we discussed in Geneva), please let us know. We would be delighted to contribute to your problems. You may remember: to test the same type of R-mutant (Ra, Rb, Rc, Rd<sub>1</sub> and Rd<sub>2</sub> or Re) from two different parent strains, such as *S. typhimurium* and *S. minnesota*.

It was a pleasure to meet you, and I hope that more opportunities may come up. With warm regards, I remain,

Yours,

*O. Westphal*  
Otto Westphal

Westphal, O.